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Case Report

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Iatrogenic coronary artery dissection that occurred during postpartum coronary angiography

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ABSTRACT

Dissection of the left main coronary artery (LMCA) during diagnostic coronary angiography is a rare but catastrophic event with a poor prognosis. Immediate reperfusion with hemodynamic support should be the primary goal in patients who develop impaired blood flow distal to the acute LMCA and the first option is coronary artery bypass grafting. We present a 37-year-old female patient in the postpartum period who was admitted to the emergency department because of chest pain and was urgently admitted to our catheterization laboratory with the diagnosis of Non-ST elevation myocardial infarction (Non-STEMI). During coronary angiography, the patient developed a dissection that started with the left main coronary artery and progressed to the circumflex and left descending artery. The patient was successfully treated with emergency percutaneous intervention.

Keywords: Iatrogenic left main coronary artery dissection, postpartum period, PTCA-stenting

INTRODUCTION

Catheter-induced left main coronary artery (LMCA) dissection is a rare complication of coronary catheterization. However, although it is the most important cause of death during diagnostic catheterization, left main coronary artery disease and catheter-induced trauma are the most important risk factors.[1,2] Its incidence was reported as 0.1% during coronary catheterization.[3-6]

Although spontaneous peripartum coronary artery dissection (CAD) is rare, it is an increasingly recognized risk for women of childbearing age. The etiology is not fully understood and optimal treatment is controversial.

In this article, we present the case of a 37-year-old woman who had to undergo emergency coronary angiography 10 days after delivery, who developed iatrogenic LMCA dissection and was diagnosed immediately and then treated with coronary percutaneous coronary angioplasty (PTCA). Pathophysiology, clinical presentation, and therapeutic options were also reviewed.

CASE

A 37-year-old female patient presented to the emergency department with chest pain and shortness of breath. She gave birth ten days ago via the C-section. The third child at birth and earlier children were alive (gravida 2 parity 2).

She has no known chronic disease. Also she has no smoking, alcohol or drug use. In the cardiovascular system examination, whose general condition is moderate, there are no additional sounds and heart murmurs in S1, S2. Breath sounds were normal, blood pressure was 120/90 mmHg, heart rate was 75 beats/minute. Electrocardiography was normal sinus rhythm. In addition, right bundle branch block was detected in the control electrocardiography (**Figure 1A, B**). Ejection fraction was 55% on echocardiography. No segmental wall motion disorder was observed. First-degree mitral regurgitation was observed. In the laboratory findings of the patient, the troponin value was found to be above the reference value. Other laboratory findings were evaluated as normal (**Table**). Emergency coronary angiography was planned for the patient who was accepted as Non-STEMI and continued to have active chest pain and was taken to the laboratory. The LMCA was seated with a 6F diagnostic catheter. After the first opaque injection, the patient's chest pain increased, and it was detected that the dissection progressed from the LMCA to the left anterior descending artery (LAD) and circumflex (CX) artery in the control injection. As the LAD and CX distal flows disappeared and the hemodynamics of the patient deteriorated, it was decided to intervene with coronary PTCA-Stent urgently. A 0.14 mm guide wire was inserted into the LAD and CX lumen. Stents were implanted in the LMCA, LAD and CX with the T-stent technique. TIMI-3 current supplied. The patient, who had no additional problems, was discharged from the hospital on the fifth day, with acetylsalicylic acid, clopidogrel, beta-blocker, proton pump inhibitor, statin, angiotensin-converting enzyme inhibitor as medical treatment. Renal function and remaining laboratory values were in normal range before discharge. Coronary stents were open in the coronary angiography performed three months later.

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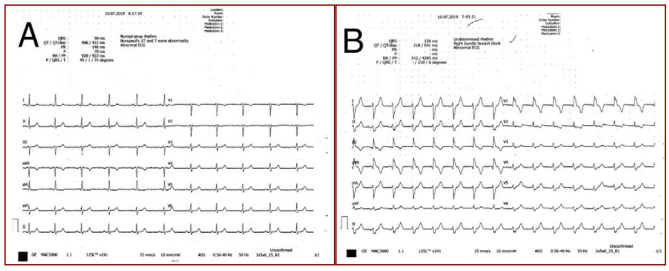

Figure 1. (A) Normal sinus rhythm is observed in the first electrocardiogram of the patient on admission to the emergency department. (B) The right bundle branch block is observed in the electrocardiogram repeated one hour later

Table. Troponin I, CK, CK-MB and D-dimer values are shown

Examination Name	Result	Unit	Reference Range
CK-MB	58	U/L	0 - 25
Troponin I	6,030	µg/L	0 - 0,300
CK	556	U/L	0 - 170
D-Dimer	2620	µg/L	0 - 500

DISCUSSION

In this article, a case of iatrogenic LMCA dissection that developed in the postpartum period and was successfully survival is presented. We did not find any other case treated in this way in the postpartum period in the literature.

The incidence of peripartum myocardial infarction is thought to be low, and it was reported that it was estimated to be 6.2 in 100000 pregnancies in a population-based study.[7] In a different study, coronary artery disease (CAD) was found to be the cause of 43% of peripartum myocardial infarction cases.[8] She emphasizes that in most cases occur in the postpartum period, the most frequently affected vessel is LAD, and more than one vessel is involved in 30% of the cases.[9] CAD can be categorized as primary or secondary, secondary dissections are typically associated with iatrogenic and trauma.[10]

The etiology of primary (spontaneous) dissection is probably related to hormonal, hemodynamic and autoimmune changes frequently encountered in most pregnant patients.[10-12] CAD should be considered in the differential diagnosis of any young woman presenting with spontaneous coronary artery dissections, signs or symptoms consistent with acute coronary syndrome. This suspicion should be further increased if a woman is peripartum. Also, once suspected, it is imperative that a definitive diagnostic study, i.e. coronary angiography, be completed, if possible, before starting treatment. Although spontaneous CAD was not observed in our case, we had to perform coronary angiography because the diagnosis was suspected (**Figure 2A, B**).

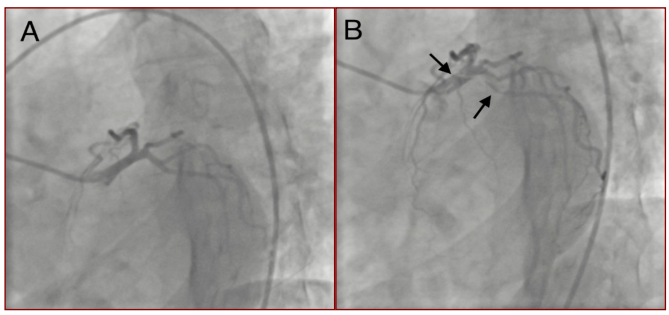

Figure 2. (A) Normal coronary artery during the first opaque injection during coronary angiography

CAD can be classified into three general categories according to its etiology.[13] 1- spontaneously in patients with atherosclerotic coronary disease; 2- as an iatrogenic complication of percutaneous coronary intervention (PCI); and 3- Idiopathic SCAD and Churg-Strauss syndrome due to conditions such as Marfan syndrome, systemic lupus erythematosus (SLE) and vasculitides, including hepatitis C virus-associated cryoglobulinemia.[14,15]

The increase in eosinophils because of changes in estrogen and progesterone levels in the peripartum period may lead to accumulation of eosinophils and then degranulation in the adventitia of the coronary arteries, which furthers the dissection.[8] Changes occur in the increase in estrogen level, proteins and mucopolysaccharides in the tunica media of the arteries, due to the reduction of proteoglycans that lead to the breakdown of collagen and elastin and thinning of the coronary wall.[16-18] This condition is more common in pregnancy because of the significant changes that occur during this period with hemodynamic, respiratory and metabolic responses that can last for 6 months after delivery.[16,17,19-21] Therefore, we think that the underlying mechanism in both primary or secondary dissection is a pregnancy-related condition. Although the exact mechanism remains unclear, there appears to be a consensus regarding the association between pregnancy-related changes in the pathogenesis of dissection.

Surgical revascularization via coronary artery bypass graft (CABG) remains the most appropriate treatment in patients with LMCA dissection or iatrogenic dissection, in patients whose dissection includes LMCA, in patients with concomitant multivessel dissection, and in patients with disease resistant to medical therapy.[22-25] Because surgery is not immediately possible, PCI remains the only salvage option for these patients to limit the extent and duration of ischemia. Many cases have reported successful results after stenting of the left circumflex and right main coronary arteries.[26-30] One of the main problems in emergency cases requiring LMCA stenting is intravascular ultrasonography (IVUS) or optical coherence tomography imaging, if possible, to ensure proper sizing and apposition of the stent after emergency stenting. In our case, LMCA, LAD and CX stent implantation was performed immediately with T-stent technique, since hemodynamics was impaired. The final images were considered quite satisfactory, although they could not be controlled with IVUS during/after the procedure (**Figure 3A, B**).

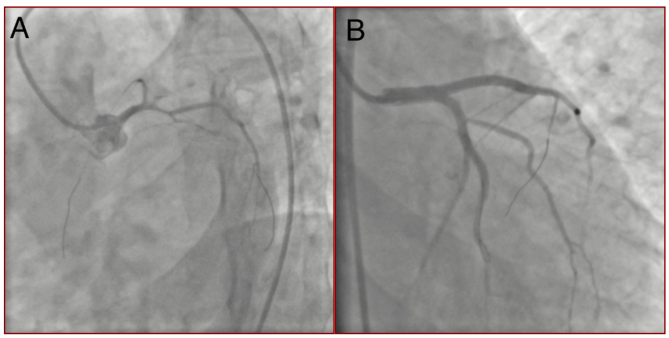

Figure 3. (A) Guidewire bracing of LAD and CX coronary arteries after KAD (B) Final image after stenting with TAP technique (B) Dissection development after first opaque injection

Whatever the mechanism, when there is a high suspicion that KAD may or is already occurring, efforts should be made by the operator to limit the iatrogenic contribution to this problem. In general, iatrogenic causes of de novo dissection include catheter tip or guide wire trauma, severe contrast injection, and overinflation of the angioplasty balloon.[31-33]

Coronary ostia should be carefully and slowly cannulated during coronary angiography in the peripartum period. In addition, it is necessary to be very careful when making an opaque injection. With worldwide experience, there is growing evidence confirming the feasibility and long-term survival of catheter-based therapy following this fatal complication. Although restenosis and revascularization following salvage stenting are not uncommon, salvage stenting should be considered for the initial treatment of iatrogenic LMCA dissection.

CONCLUSION

Iatrogenic LMCA dissection is an important complication during coronary catheterization and may be catastrophic. Prompt intervention is crucial if encountered. CABG is also life saving if percutaneous intervention is not successful.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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